Marine Environmental Data Service

Specifications for an Oceanographic Data Retrieval System

Group Five Consulting Ltd.

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Group Five Consulting Ltd.
Ottawa

DEPARTMENT OF FISHERIES AND OCEANS
OTTAWA, CANADA

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ABSTRACT

A system for the integration of output data from various environmental data bases such as those held by the Marine Environmental Data Service (MEDS) and the Atmospheric Environment Service (AES) is developed and described. Output from the system consists of a single sequential magnetic tape file which is also self-documenting. Suggestions for implementation of the system are presented.

RESUME

Un système pour l'intégration de données de sortie provenant de diverses bases de données environnementales comme celles détenues par le Service des données sur le milieu marin (SDMM) et le Service de l'environnement atmosphérique (SEA) est élaboré et décrit. La sortie du système se compose d'un fichier séquentiel unique sur bande magnétique qui comprend toute la documentation nécessaire. Des propositions concernant l'application du système sont présentées.

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1 BACKGROUND

This document forms the specifications for a system to retrieve oceanographic data from several files or databases and to write these data to a sequential file on magnetic tape. The specifications have been written as a user's manual which decribes the files, programs, and reports that make up the system. Although the contents of each file and report, and the function of each program, have been described in sufficient detail to allow suppliers to quote on implementing the system, the precise layout of the files and the internal logic of the programs have not been defined at this stage. Suppliers may wish to address these points in greater detail when replying to a Request for Proposals.

2 INTRODUCTION

The user of oceanographic data is often faced with the problem that the data required has to be obtained from more than one source. When this happens, the user has to write software to extract the data from several files and databases, each of which may contain data items that are not required for a particular project. The purpose of this system is to allow the user to obtain data on one file even if these data come from more than one source. Furthermore, the system allows the user to specify the order of the data items in each record of the Output File.

The system writes the Output File containing the data that the user has requested to nine track magnetic tape. Each Output File on the tape is preceded by a documentation file which describes the contents of the data file requested by the user. This documentation file contains:

1) The start date of the data on the Output File.

2) The end date of the data on the Output File.

3) The frequency of the data on the Output File.

4) The format of each record on the Output File.

5) The type of data and the units of the data in each field of the output record.

6) The record length and block size of the Output File.

As well as receiving the tape containing the documentation file and the data file, the user will be sent a listing of the documentation file along with the tape. He will then know exactly what the tape contains.

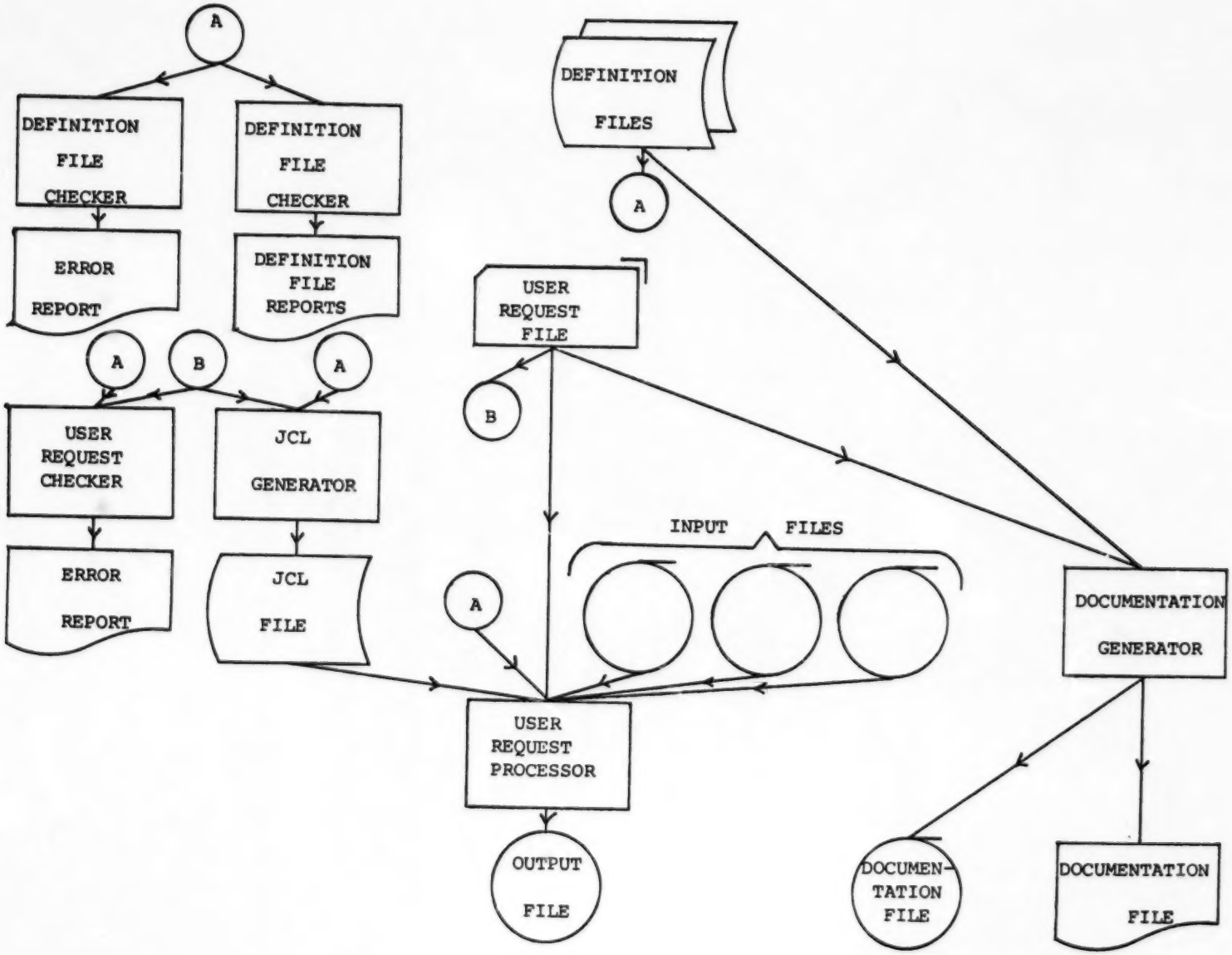


FIGURE 1 SYSTEM FLOWCHART

3 USER REQUEST COMMANDS

The User Request Commands allow the user to specify how the data is to be extracted from the input files and the format of the data on the Output File.

An input file may be a sequential file, a random access file, or a database, but for the purpose of the User Request Commands it will always be referred to as an input file.

The syntax of the User Request Commands is similar to that of COBOL statements. The following general points can be made about the syntax of the User Request Commands:

1) Each command must start on a new line.

2) Each command must end with a period.

3) Commands can continue onto more than one line.

4) Each key word, symbol, string, or number in a command must be separated by at least one space.

5) There are no rules about the order in which the commands should be written but obviously the commands must be specified in a logical order, which is, in fact, the order in which the commands are presented in this section.

3.1 Start and End Times

START or END = YYMMDD. or YYMMDDhhmm.

Data will be selected from the input file(s) from the START time to the END time inclusive. The time can either be specified as YYMMDD (e.g. 790705 for July 5, 1979), in which case data would be selected for that entire day, or as YYMMDDhhmm (e.g. 7907051830 for 6:30 pm on July 5, 1979), in which case data would be selected starting from that time or ending at that time.

```
e.g.   START = 790101.   Select data from Jan. 1, 1979
       END = 790531.     to May 31, 1979 inclusive.
```

3.2 Input File Specification

PFILE-n = ipfile-type. 1 n = 99

This command tells the system the type of each input file. Listings of the input files names and the data that can be retrieved from each input file are produced by the Definition Reporter. Although the system is limited to a specified number of input files simultaneously, n can be given any value within the prescribed range.

e.g. IPFILE-4 = AES. 4 input files of the AES type

3.3 Frequency

FREQUENCY = n MONTH(S). 1 n = 36
n DAY(S). 1 n = 1000
n HOUR(S). 1 n = 72
n MIN(S). 1 n = 720
n SEC(S). 1 n = 60

ALL IPFILE-1 ... IPFILE-n .

This command specifies the frequency from the START time at which records in the input file(s) will be inspected by the Output Field Selection Commands.

If ALL is used then the times on the first input file specified will be used as the times in the Output File.

If the ALL command is used with one or more of the optional input file clauses, then every record in each of those files will be inspected for the selection of data.

e.g. FREQUENCY = 3 HOURS. Inspect input file records every 3 hours using the START time as time zero.

FREQUENCY = ALL. Inspect ALL records in ALL input files.

FREQUENCY = ALL IPFILE-2. Inspect ALL records in input file 2.

FREQUENCY = ALL IPFILE-1 IPFILE-4. Inspect ALL records in input files 1 and 4.

3.4 Window

```
WINDOW = n MONTH(S).
         n DAY(S).
         n HOUR(S).
         n MIN(S).
         n SEC(S).
```

This command is used when the data on the input files were recorded at different times.

```
e.g.    FREQUENCY = 3 HOURS.
        WINDOW = 30 MINS.
```

The times on the output records are at 3 hour intervals but data will be selected from records in the input files whose times are 15 minutes either side of the output record time. If the same type of data being selected occurs at different times within the Window, then the data occurring at the time nearest to the time of the output record will be selected.

```
e.g.    FREQUENCY = ALL.
        WINDOW = 1 HOUR.
```

Select data from a window 30 minutes either side of the times of the records in the first input file specified.

3.5 Area Specification

```
AREA  n deg1  min1  sec1      1   n  = 10
        deg2  min2  sec2
         "     "     "
         "     "     "
         "     "     "
        degN  minN  secN.     3   N  = 20
```

The command is used to specify the points on a polygon which defines the boundary of AREA n. The points on the boundary are given in degrees, minutes and seconds. The areas defined with the command can then be used in an Output Field Selection Command to select data whose positions are defined in degress, minutes and seconds in the input file.

3.6 Conditional Creation of Output Record

```
CREATE OPREC-n  ALWAYS .
                -n  CONDITIONALLY .
```

Depending on the results of the optional conditional tests in Output Field Selection Commands, this statement allows the user to decide if the output record is to be created or omitted from the output file.

If this command is not used then the default will be to ALWAYS create a particular output record even if any of the conditional clauses in an Output Field Selection Command are not satisfied.

e.g. CREATE OPREC-2 ALWAYS.

Output record 2 of the output record set will be created even if one or more of the conditional statements used (if any) in an Output Field Selection for the selection of data for output record 2 was false.

e.g. CREATE OPREC-1 CONDITIONALLY.

Output record 1 of the output record set will only be created if all of the conditional statements used (if any) in the selection of data for output record 1 were true.

3.7 Output Field Selection

```
OPREC-i-FIELD-j  =  IPFILE-n, item-name-1
                  , IF item-name-2 = a1 (THRU a2)
                  , IF AREA = n
                  , STATION-ID (YES)(NO)
                  , CREATE OPREC (ALWAYS) (CONDITIONALLY) .
```

Allows the user to conditionally select data from the record being inspected in IPFILE-n, and to specify the field to which the data will be copied in the output record.

```
OPREC-i-FIELD-j        1   i  = specified limit, and
                       1   j  = specified limit
```

There can be up to 'i' records for the same time in the Output File. This feature allows the user to create a set of output records for the same time. For example, to create a set of output records for the same time with each record containing data for a different location, or records containing different data for the same time.

The field number in the output record to which the data will be copied is 'j'.

e.g. OPREC-1-FIELD-5 Copy the data to field 5 of output record 1.

IPFILE-n

Specifies the input file from which the data will be selected. This file must have been specified in a previous Input File Specification Command.

item-name-1

Specifies the type of data that is to be selected from the input file record under inspection. A list of the types of data that can be selected from each type of input file is given by the Definition Reporter.

, IF item-name-2 = a1 (THRU a2)

This optional clause tells the system to select item-name-1 only if the condition specified in the statement is true.

e.g. IF STATION = "MISCOU"
IF WIND-VELOCITY = 50 THRU 100

, IF AREA = n

This optional conditional clause allows the user to select item-name-1 only if the location at which the reading was taken lies within AREA n. The bounds of the area must have been specified in a previous Area statement.

e.g. IF AREA = 2

, STATION-ID (YES)(NO)

This clause determines the STATION-ID if the data item (see Figure 2) is to be written to the output field.

If this clause is not used, the default is to write the STATION-ID to the output field.

, CREATE OPREC (ALWAYS) (CONDITIONALLY)

The function of this clause is the same as the Conditional Creation of Output Record Command, but it applies only to the data item being selected in this Output Field Selection Command. The Conditional Creation of Output Record Command will override this clause.

If this clause is not used then the default is to use this clause with the ALWAYS option.

e.g. CREATE OPREC ALWAYS.

Always create the output record, even if the conditional test is false, but flag the output record field as false (flag = 2).

e.g. CREATE OPREC CONDITIONALLY.

If the result of the conditional test in this command is false, then do not create the output record.

The following examples show how the Output Field Selection Command can be used to select data for the output record.

```
OPREC-1-FIELD-2 = IPFILE-3, WIND-VELOCITY.
```

Select the wind velocity from IPFILE-3 and copy it to field 2 of the first output record in the set of output records.

```
OPREC-1-FIELD-2 = IPFILE-1, DRY-BULB-TEMP,
                            IF DRY-BULB-TEMP = 0 THRU 40
                            CREATE OPREC ALWAYS.
```

Only select the dry bulb temperature from IPFILE-1 if it is in the range 0 thru 40. Create the output record even if the dry bulb temperature is missing or not within the range specified.

4 FILES

4.1 Definition Files

There are two definition files. Together they define valid input file names, the valid item names used in the User Request Commands, and the data items that can be selected from each input file. In addition, the output units and format of each item name are defined, and the origin (ie, the original source of the input file, for example, Atomspheric Environmental Sources, AES) is documented.

Definition File 1

This file contains information on the organization that originally recorded the data, together with an overview of the type of data on the file. Record layout of this file is as follows:

```
ipfile-name-1  origin-descriptor-line-1
ipfile-name-1  origin-descriptor-line-2
    .                   .
    .                   .
    .                   .
ipfile-name-1  origin-descriptor-line-n   1  = n
ipfile-name-2  origin-descriptor-line-1
    .                   .
    .                   .
    .                   .
ipfile-name-N  origin-descriptor-line-n   1  = N
```

ipfile-name-i is an acronym (maximum number of characters to be determined later) that identifies the input file, e.g. AES, MEDS-OCEAN-IV.

origin-descriptor-i is a line of text containing the name and address of the organisation which procduced the data, the name and telephone number of a person to contact, etc.

Definition File 2

This file gives the valid item names for each input file type, together with the output units and format on the Output File of these item names. The record layout of this file is as follows:

```
ipfile-name-1   item-name-1   op-units   format
ipfile-name-1   item-name-2   op-units   format
    .               .            .
    .               .            .
ipfile-name-1   item-name-n   op-units   format  1  = n
ipfile-name-2   item-name-1   op-units   format
    .               .            .
    .               .            .
ipfile-name-2   item-name-n   op-units   format
    .               .            .
    .               .            .
    .               .            .
ipfile-name-N   item-name-n   op-units   format  1  = N
```

The same item name may be used in more than one input file type. For instance, wind velocity may be recorded by more than one organization and therefore be available on more than one input file type, so it is quite permissable to use the item name WIND-VELOCITY in more than one place in definition file number two, but one must take care to ensure that the output units and format are the same in all cases for the same item name so that the Output File will always report the same type of data in consistant units and format. This type of error is checked for in the definition file check program.

Item formats are given in FORTRAN terms, e.g. F5.1, I3, E7.3.

4.2 User Request File

This will be an input file, created by the user to specify the data to be selected from the input files and how the data is to be written to the Output File. The syntax of this file is defined in the section on User Request Commands.

4.3 Documentation File

This file is produced from the definition files and the request data file. It will immediately precede the Output File on the tape which will be sent to the user and will always have the same record length and block size, say a record of 80 and a block size 3200. The user will be sent a listing of this file together with the output tape.

The documentation file will tell the user the following information about the data on the Output File:

The starting date of the data.

The ending date of the data.

The frequency of the data.

The format of each record in the file.

Each record in the Output File will have the same format. The format can be specified as in a Fortran statement.

The type of data contained in each field of the records in the Output File together with the units of the data.

The record length and block size of the Output File.

The following is an example of what the documentation file should look like.

```
Start Date:  YY/MM/DD
End Date  :  YY/MM/DD
Frequency :  01:00:00
Format:      (6I2, I1, 10A1, F6.3, I1, I3, I1, 10A1,
              F5.1, I1, I3, I1, F7.3)

Record Layout ...

Date and time:   YY/MM/DD/HH/MM/SS                  6I2
'FIELD-1'        WAVE-HEIGHT             metres     F6.3
'FIELD-2'        WAVE-PERIOD             secs       F6.3
'FIELD-3'        WIND-DIRECTION-ELEMENT  AES code   I3
'FIELD-4'        WIND-DIRECTION          degrees    F5.1
                                  (N=360,0=calm)
'FIELD-5'        WIND-SPEED-ELEMENT      AES code   I3
'FIELD-6'        WIND-SPEED              km/h       F7.3

Record Length:     61
Blocking Factor:   50
Block Size:      3050
```

4.4 JCL File

The JCL File to run the Request Processor is unique to each job and is created by the JCL Generator to meet each request for data.

4.5 Input Files

The number and type of input files will vary from job to job depending on the specific requests of the user.

Input files can be sequential or random access files sorted by time, or databases. The following points can be made about the input files:

The time frequency of the records on an input file may or may not be consistent. For example, the input file records may be recorded every hour with the occasional hour or hours missing; the frequency of the records could be irregular; there could be more than one record for the same time; when there is more than one input file it will be quite possible to have one input file which has records at regular time intervals, another which has multiple records for the same time and yet another which has records at infrequent times.

4.6 Output Files

The Output File for a particular request will follow the documentation file on the tape that will be sent to the user. Each record of the Output File will have the format shown in the diagram on the following page.

The first field of each record on the Output File contains the time of that record down to the nearest second. Following the time field there are a number of fields corresponding to the number of data items requested by the user in the Output Field Selection Command.

Each field is divided up into three parts. The first part is a one byte field which contains a flag indicating the following:

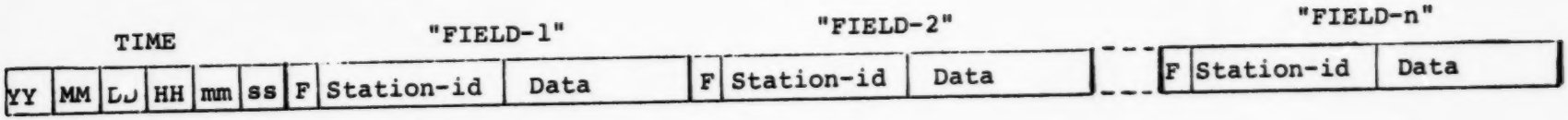
Flag = 0 if the data item was missing on the input file

Flag = 1 if the data item was present on the input file

Flag = 2 if the data item was present on the input file, but was not selected because the condition in the Output Field Selection Command or the Conditional Creation of Output Record Command was not satisfied.

The second part of each field contains the station identification of the data in the third part of the field. The station identification may or may not be present depending on which option was selected in the STATION-ID clause of the Output Field Selection Command pertaining to that field.

There can be more than one output record for each time on the Output File.



"Field" Flag (F) = 0 is data-item was missing on input file

= 1 if data-item was present on input file

= 2 if data-item was present on input file but was not selected because the condition in the Output Field Selection Command was not satisfied

Note: The station-id is optional depending on the use of the STATION-ID clause in the Output Field Selection command

FIGURE 2 RECORD LAYOUT OF OUTPUT FILE

5 PROGRAMS

5.1 Documentation Generator

The Documentation Generator creates the Documentation File using the User Request File and the two Definition Files to obtain the necessary information. The Documentation Generator writes the Documentation File to the output tape as the first file on the tape and also prints a listing of the Documentation File.

5.2 JCL Generator

The JCL generator generates the unique JCL that will be required for each user request. It will have to be capable of handling the following points:

1) The number of input files will vary from job to job.

2) The block size and record length of each input file will have to be generated as part of the JCL.

3) The record length of Output File will have to be determined from the Output Field Selection Commands. When there is more than one output record for each time on the Output File, then the record length of the Output File will be made equal to the longest output record.

4) Since the record length of the Output File can vary from job to job, the JCL generator must be capable of varying the blocking on the Output File to ensure that the block length of the output file does not become too large, or for that matter, too small. The block length on the Output File should never be greater than 5000 bytes and never smaller than 3000 bytes.

5) Since the block size and record length of the Output File must also be written to the documentation file as well as to the file of JCL, the same module should be used by both the JCL Generator and the Documentation Generator to determine the record length and block size of the Output File.

6) The JCL Generator also has to scan the Input File Specification Commands in the User Request File in order to determine which object modules of the system have to be linked at run time to create the load module depending on which input files have been referred to in the Input File Specification Commands. If all the code to process all input files which are defined to the system were to be linked in at the same time to create the run time load module, then as well as being a very large program, the program would contain many modules that would not be required for a particular run. Therefore, the JCL generator must be capable of generating the JCL to link in only those modules that are required to process the input files that have been defined in the User Request File.

5.3 User Request Checker

The User Request Checker scans the User Request File to check the following:

1) That the syntax of all the commands is correct

2) That the input file names are valid

3) That the item names are valid and are associated with the correct input files, that the user has not asked to extract an item of data from an input file that does not contain that type of data.

4) That the user requests are entered in a logical order. For example, the program has to check that the user does not refer to an input file in an Output Selection Command that has not been previously defined in an Input File Specification Command.

5.4 User Request Processor

The User Request Processor is the heart of the system. It is this program that extracts the data requested by the user from the input files and creates the Output File.

5.5 Definition File Checker

This program performs a number of checks on the two definition files to ensure that the information in each file contains no inconsistencies. The errors that this program checks for are:

1) That no input file type name is used in Definition File 2 that does not occur in Definition File 1.

2) That the output units and format used for item names in Definition File 2 are the same for the same item name. For instance, if the item name WIND-VELOCITY can be used for more than one input file type, this program must check that the output units in both cases are the same.

5.6 Definition File Reporter

As part of the documentation that goes along with this system, each user will be provided with information on the contents of the two definition files. These reports will be generated by the definition reporter.

The first report will use the information in definition file one. It will list the valid input file types alphabetically together with the information on the origin descriptor lines. This will give the user information on the input files that are defined to the system and the name of the organization which produced each input file.

The second report will give the item names of the data which can be extracted from each input file type together with the output units of each item of data on the Output File that the user will receive.

APPENDIX A -- IMPLEMENTATION

This document has presented the specifications for a system to retrieve oceanographic data in the form of a user's manual. To implement the system it is suggested that the following steps be undertaken.

1) Review and revision of this document by MEDS staff and other interested parties.

2) Write all the modules of the system except those modules which extract data from the input files or databases. For this step "dummy" input modules can be used which will return credible data. This top-down approach will allow the data retrieval modules to be written after the rest of the system has been thoroughly tested and approved by the users.

3) Select up to 6 input files or databases that will be used for the first version of the system. More can be added at a later date.

4) Write the data retrieval modules for the input files that were selected in 3). These modules can be written and tested simultaneously.

APPENDIX B -- DRAFT USER'S MANUAL

OCEANOGRAPHIC DATA RETRIEVAL SYSTEM

*** USER'S MANUAL ***

This utility accepts a request for oceanographic data and provides a tape of data formatted acccording to the user's request.

The User's Request

All requests must be presented in writing and must provide the following information:

1. Data items required e.g. WIND SPEED, WIND DIRECTION
2. Number of files required and data items to be included in each.
3. Station, and station identification number if possible, for which data is required.
4. Start data of data required.
5. Frequency of readings required.
6. End date of readings required.

Note: The user may not request the output record length or blocking factor, or the units in which output data are recorded. The system will define reasonable numbers e.g.

Record Length	Blocking Factor	Blocksize
50 - 100	40	2000 - 4000
100 - 150	30	3000 - 4500
150 - 200	25	3750 - 5000
.	.	.
.	.	.
etc.	etc.	etc.

Input Files

The input files are of 'n' formats, one format for each type of file from which data can be extracted. For example:

```
1) REC-FMT-MEDS-WAVES     - MEDS wave data format
2) REC-FMT-AES            - AES data format
        .                         .
        .                         .
      etc.                      etc.
```

Output Files

Each output file is formatted according to the user's request with a few exceptions. Basically, one or more records for the same time are generated containing the data items in the order specified in the request. Each record is preceded by a field containing the time: YY/MM/DD/HH/MM/SS. Each output 'field' consists of three entities: a 1-byte flag which contains a '1' if the data is present or a '0' if the data is missing; a 10-byte field containing the station-id; and a 10-byte field of data in units determined by the system.

The output data file is preceded by a documentation file which provides a detailed description of the data file which follows.

Coding a Request

In order to generate the data file, the user's request has to be coded and input to the system which creates the output file. The following example illustrates the procedure.

1. Data items required: WAVE-HEIGHT
   WAVE-PERIOD
   WIND-DIRECTION
   WIND-SPEED

2. One file containing all above items in that order in each record.

3. Wind Station: Miscou Island - Station Number 810100
   Wave Station: Miscou Island - Station Number 51

4. Start date: January 1, 1969

5. Frequency: hourly

6. End date: December 31, 1978

Coded Request

The files required to create this file must be obtained from the appropriate source and their format identified. Each file format has a code name e.g. REC-FMT-AES and these codes must be obtained. The request consists of 3 parts:

1. Start, end and frequency information

2. Input file format identification

3. Output file specifications

The following example serves as an explanation and each line is described below:

```
 1.  START = 690101
 2.  END = 781231
 3.  FREQUENCY = 01:00:00
 4.  IPFILE-1 = REC-FMT-MEDS-WAVES
 5.  IPFILE-2 = REC-FMT-AES
 6.  OPREC-1-FIELD-1 = IPFILE-1,WAVE-HEIGHT,FOR MISCOU
 7.  OPREC-1-FIELD-2 = IPFILE-1,WAVE-PERIOD,FOR MISCOU
 8.  OPREC-1-FIELD-3 = IPFILE-2,WIND-DIRECTION-ELEMENT,
                                FOR MISCOU
 9.  OPREC-1-FIELD-4 = IPFILE-2,WIND-DIRECTION,FOR MISCOU
10.  OPREC-1-FIELD-5 = IPFILE-2,WIND-SPEED-ELEMENT,
                                FOR MISCOU
11.  OPREC-1-FIELD-6 = IPFILE-2,WIND-SPEED,FOR MISCOU
```

Lines 1 and 2 indicate the start and end dates for which data will be provided in the form: YY/MM/DD

Line 3 provides the frequency at which readings are recorded in the form: HH:MM:SS, i.e. in hours, minutes, and seconds.

Lines 4 and 5 describe the file formats of the two input files required for this request, IPFILE-1 and IPFILE-2.

Line 6 says: get WAVE-HEIGHT for station MISCOU from IPFILE-1 (which has been defined by REC-FMT-MEDS-WAVES) and put it in FIELD-1 of OPREC-1.

Line 7 says: get WAVE-PERIOD for station MISCOU from IPFILE-1 (which has been defined by REC-FMT-MEDS-WAVES) and put it in FIELD-2 of OPREC-1.

Line 8 says: get WIND-DIRECTION-ELEMENT for station MISCOU from IPFILE-2 (which has been defined by REC-FMT-AES) and put it in FIELD-3 of OPREC-1.

Line 9 says: get WIND-DIRECTION for station MISCOU from IPFILE-2 (which has been defined by REC-FMT-AES) and put it in FIELD-4 of OPREC-1.

Line 10 says: get WIND-SPEED-ELEMENT for station MISCOU from IPFILE-2 (which has been defined by REC-FMT-AES) and put it in FIELD-5 of OPREC-1.

Line 11 says: get WIND-SPEED for station MISCOU from IPFILE-2 (which has been defined by REC-FMT-AES) and put it in FIELD-6 of OPREC-1.

This example assumes that the input files contain data for more than one station. If data for only the station requested were present, the parameter FOR MISCOU would not have been necessary and the station identification present would have automatically been picked up.

Documentation File

The documentation file, as explained above, precedes the output file and describes the contents of the output file. The format is as follows:

```
Start Date:  YY/MM/DD
End Date  :  YY/MM/DD
Frequency:   01:00:00
Format:      (6I2,6(I1,10A1,I10))

Record Layout:  YY/MM/DD/HH/MM/SS
'FIELD-1'       WAVE-HEIGHT                 mm
'FIELD-2'       WAVE-PERIOD                 seconds
'FIELD-3'       WIND-DIRECTION-ELEMENT      AES code
'FIELD-4'       WIND-DIRECTION              10ths degrees
                                            (N=360,0=calm)
'FIELD-5'       WIND-SPEED-ELEMENT          AES code
'FIELD-6'       WIND-SPEED                  100ths km/h

Record Length:  138
Blocking Factor: 30
Block Size:    4140
```

Data Items Available to Users from Various File Formats

REC-FMT-AES

WIND-DIRECTION-ELEMENT	AES code
WIND-DIRECTION	10ths degrees (N=360,0=calm)
WIND-SPEED-ELEMENT	100ths km/h
WIND-SPEED	AES code
TEMPERATURE-DRY-BULB	10ths degrees Celcius
TEMPERATURE-WET-BULB	10ths degrees Celcius
.	.
.	.
.	.
etc.	etc.

REC-FMT-MEDS-WAVES

WAVE-HEIGHT	mm
WAVE-PERIOD	seconds
.	.
.	.
.	.
etc.	etc.